DEPARTMENT OF HEALTH & HUMAN SERVICES Public Health Service

Centers for Disease Control
and Prevention (CDC)
Atlanta GA 30333

TB Notes
No. 3, 2005

Dear Colleague:

The 2005 National TB Controllers Workshop was held from June 28 through 30 at the J.W. Marriott Lenox Hotel in Atlanta, Georgia, with preworkshop meetings held on June 26 and 27. Invited participants included state and big city TB controllers, TB Nurse Consultants, TB Program Managers, Division of Tuberculosis Elimination (DTBE) field staff, and Regional Training and Medical Consultation Center leadership. The title of this year's workshop was "*Can You Hear Me Now? Let's Talk TB!*" with the meeting's activities highlighting communication, education, and training issues as they relate to TB control. The workshop committee invited participants to submit poster abstracts. These posters were a very important part of the meeting in that they allowed the presentation and sharing of the contributions of TB control staff from across the nation in high- and low-morbidity states and cities. Among the highlights of the 2005 workshop was the opportunity to hear from persons affected by TB. The stories were particularly relevant to the meeting in that both patients were spouses of CDC employees. Teresa Rugg, of the organization RESULTS, spoke of her friend Claudia Lacson, a health care worker here in Atlanta who died in July 2004 of TB meningitis. Claudia's husband, Romel Lacson, who had been a behavioral scientist at CDC, subsequently left the agency to start the TB Photovoice project, a website devoted to providing education about TB and TB meningitis (http://www.tbphotovoice.org/tbpv_ver5_content.html). Janet Collins, PhD, who has been serving as acting Director, National Center for HIV, STD, and TB Prevention (NCHSTP), gave a moving account of her husband's ordeal with the same disease. The Mycobacteriology Laboratory Branch facilitated access to *M. tuberculosis* nucleic acid amplification testing by the Grady Hospital microbiology laboratory, which promptly established a diagnosis of TB meningitis. He was subsequently put on the appropriate medications; very thankfully he survived and has recovered. Experiences such as these served to remind us of how dangerous TB is, and to emphasize the importance of the focus of our meeting, TB education and training.

The BOTUSA Project, a collaboration between CDC and the Botswana government, commemorated its 10th anniversary in Gaborone, Botswana, on March 1 with a 1-day conference on TB and HIV programs and research. BOTUSA was initiated in 1995 as a partnership between the Ministry of Health's Botswana National TB Program (BNTP) and DTBE, focusing on public health research and programs to combat the dual epidemics of TB and AIDS. The project has proven to be remarkably productive, particularly in areas such as strengthening TB surveillance and establishing the Isoniazid Preventive Therapy (IPT) program, which has since been rolled out nationally. I was invited to be one of the speakers at the anniversary conference; for your information, the text of my remarks (published in the *2004 Annual Summary, BOTUSA*), has been included in this issue.

The American Society for Microbiology held its 105th General Meeting in the Georgia World Congress Center in Atlanta, Georgia, June 5–9, 2005. DTBE was represented by several members of the Mycobacteriology Laboratory Branch, who presented several poster abstracts of their outstanding work. Their participation contributed to the advances being made in applied laboratory science toward the elimination of TB. The scientific program featured nearly 300 individual colloquia, symposia, roundtable discussions, award lectures, and poster sessions, creating a well-rounded program.

The Advisory Council for the Elimination of TB (ACET) met in Atlanta on June 8 and 9, 2005. After the welcome from Drs. Masae Kawamura, Director, TB Control Section, San Francisco Department of Public Health, and Ronald Valdiserri, Deputy Director, NCHSTP, we introduced the first topic of discussion, health disparities and TB. We heard from Dr. Garth Graham, Department of Health and Human Services, regarding the ongoing problem of health disparities among minority populations. We then heard two perspectives on TB as a health disparity: CDC's viewpoint, given by Dr. Hazel Dean, and the State of California's perspective, from Dr. Jennifer Flood of the California TB Control Branch. Ms. Deliana Garcia, Director, International Research and Development, Migrant Clinicians Network, discussed the role of primary care in relation to TB control. After lunch, Dr. Janet Collins and I provided the directors' updates for NCHSTP and DTBE. Mr. Charles Schable provided follow-up thoughts on a topic discussed at previous ACET meetings, the potential synergy between TB control programs and emergency preparedness programs. Drs. Gerald Mazurek and Andrew Vernon provided an update on the process for developing guidelines for the use of the new QuantiFERON-TB Gold® test, and Dr. Dixie Snider gave a summary of research priorities as they relate to infection control precautions for TB elimination. Dr. Zach Taylor and I gave an update on the cases of TB and MDR TB being found in Hmong refugees. Dr. Tom Shinnick informed the group about new diagnostic tools being developed, and Dr. Sheldon Morris of the FDA gave us an update on the issues pertaining to the development of a new TB vaccine and federal drug regulation.

An invited consultation was held at CDC in Atlanta July 11-12, 2005, to review performance data on the most recently FDA-approved interferon gamma release assay, the QuantiFERON-TB Gold® test. Presenters included Drs. Nobuyuki Harada and Kazue Higuchi from Japan, Dr. Luca Richeldi from Italy, Dr. Paul Vinton from Australia, Dr. Esmaeil Porsa from Houston, Texas, Dr. Sandra Arend from the Netherlands, and Dr. Gerald Mazurek from CDC. Input from these investigators, from the test manufacturer, and from 12 invited domestic TB experts is being considered as CDC develops guidelines for the use of this new test in the United States.

Kenneth G. Castro, MD

In This Issue

Note: The use of trade names in this issue is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

TB Notes

Centers for Disease Control and Prevention
Atlanta, Georgia 30333

Division of TB Elimination ♦ National Center for HIV, STD, and TB Prevention

Number 3, 2005

HIGHLIGHTS FROM STATE AND LOCAL PROGRAMS

Mycobacterium bovis in New York City—an Unexpected TB Investigation

A full description of the investigation of human M. bovis infection in New York City was published in the MMWR: CDC. Human tuberculosis caused by Mycobacterium bovis—New York City, 2001–2004. MMWR 2005 June 24; 54(24): 605-608.

Background. In January 2001, the New York City Department of Health and Mental Hygiene (DOHMH) Bureau of TB Control (BTBC) began genotyping isolates from all culture-positive TB cases using two methods, IS*6110*-based restriction fragment length polymorphism (RFLP) and spoligotyping. A protocol was developed for conducting cluster investigations when two or more isolates shared the same RFLP and spoligotype, with the goal of identifying previously unrecognized epidemiological links between the cases.

In February 2002, a cluster of three cases of TB due to the same strain of *Mycobacterium bovis* (*M. bovis*) was detected, and a cluster investigation was initiated. Over the next 18 months, several more cases sharing the same spoligotype were detected, as were additional clusters of *M. bovis* with different spoligotypes. No human-to-human transmission linkages were established within any of the clusters, but two significant observations were made. First, it was noted that the patients were mostly Mexico-born, many from the Puebla region of Mexico. Second, several US-born children were included in the largest cluster of *M. bovis* cases, all of Mexico-born parents.

In September 2004, a case of fatal peritonitis due to *M. bovis* in a 15-month-old child came to the attention of the Director of the BTBC. The case highlighted the question that had been asked but not yet answered during the cluster investigations, "Why would a US-born child have TB due to *M. bovis*?" Even before universal genotyping in NYC, *M. bovis* was the presumed source of infection for a handful of pyrazinamide-resistant patients each year; however, the cases occurred in non–US-born adults from countries where bovine TB and unpasteurized dairy products were prevalent, and the disease was regarded as reactivation of latent infection acquired outside of the United States.

The US-born children with TB due to *M. bovis* challenged our typical thinking about the source of this infection. Were the children traveling out of NYC and becoming infected in the country of birth of their parents, Mexico? Were the children exposed to infectious pulmonary cases of TB due to *M. bovis* in NYC? Was there a foodborne source of infection in NYC, as investigators in San Diego postulated for their pediatric TB cases? In San Diego, health officials attributed pediatric TB due to *M. bovis* to the readily available unpasteurized Mexican cheese across the border, but transborder traffic could not as easily account for *M. bovis* in NYC.

TB Notes is a quarterly publication of the Division of TB Elimination (DTBE), National Center for HIV, STD, and TB Prevention (NCHSTP), Centers for Disease Control and Prevention (CDC). This material is in the public domain, and duplication is encouraged. For information, contact
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http://www.cdc.gov/nchstp/tb,
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Investigation. In addition to the usual source-case investigations conducted for all pediatric TB cases and the cluster investigations underway based on genotyping, we reinterviewed all available patients (or parents of patients) to try to identify the source of *M. bovis* infection. We also began an investigation into foodborne transmission, an endeavor which was new to the usual scope of work of the BTBC. With the assistance of staff of DTBE and the National Center for Infectious Diseases (NCID), we developed contacts within the US Food and Drug Administration (FDA) and the US Department of Agriculture (USDA). In addition, we partnered with the NYC DOHMH Bureau of Communicable Diseases and the New York State Department of Agriculture and Markets (NYS Ag and Markets). Finally, we sought laboratories best able to test samples of Mexican cheese for the presence of *M. bovis*.

Results. Through our interviews, we learned that most of the US-born children had never traveled outside of the country, and had no history of exposure to the few pulmonary TB cases due to *M. bovis* that had occurred in New York City. We also found that many of our patients had consumed Mexican-produced cheeses while living in New York City. They had obtained these products from friends or family who had transported it in luggage, through courier agencies, from Mexican grocers, and from door-to-door vendors.

From the USDA and the NYS Ag and Markets, we learned that cattle in New York State and surrounding states are certified "TB-free" and that dairy products sold in retail stores in New York State must be pasteurized. Also from the USDA, we learned that couriers arriving from Mexico with packages intended for individual consumption may bring dairy items into the United States, but are prohibited from bringing in produce, chicken, and pork. Though couriers ostensibly bring packages into the country for individual consumption, they may bring large quantities of food that has the potential to be sold commercially. From the FDA, we learned that cheeses imported for retail sale must be pasteurized unless aged greater than 60 days. We also learned that imports of soft cheeses arrive daily in the United States and that most of these imports are not inspected owing to lack of resources.

Our search for a laboratory that would work with us led us beyond the mycobacteria lab we were familiar with. We learned that laboratories must have a Biosafety Level 3 certification to attempt to isolate this organism from food. This excluded the FDA laboratory. The NYC TB lab, though familiar with mycobacteria, did not work with food products. The DOHMH environmental lab was willing to attempt to grow the organism from cheese, but was more familiar with common foodborne bacteria and less familiar with the properties associated with mycobacteria. They developed a protocol for testing cheese samples but have not had success at growing the organism to date. The USDA laboratory in Ames,

Iowa, was experienced in working with this organism through efforts in bovine TB eradication in Texas, New Mexico, Michigan, and California, and they were willing to work with us. The Ames laboratory agreed to develop a protocol for testing cheese samples for the presence of the *M. bovis*, and also for comparing the genotyping of our human cases with bovine cases in the Ames database.

Conclusion. While we knew that human TB due to *M. bovis* was not uncommon in regions of the world where dairy pasteurization is not universal and bovine TB remains problematic, we did not expect to find it in US-born children in New York City. We were not familiar with investigating foodborne transmission, and we had to adapt what we learned from investigations of other foodborne pathogens such as *Listeria monocytogenes* and *Salmonella sp.* to *M. bovis* which has a potential latency far in excess of these organisms. We have learned that within a certain subset of our population, the Mexican community, it is not difficult to obtain food items that are produced outside of the United States and that may not meet federal and state standards for food safety. We have had to review and revise the materials available to providers and to the public regarding TB disease to include the possibility of foodborne transmission of TB.

The investigation of *M. bovis* in New York City is ongoing. We continue universal genotyping of isolates of all culture-positive TB cases. We are collaborating with the USDA laboratory in comparing human *M. bovis* isolates with *M. bovis* isolates from cattle in the United States and Mexico, and in testing of cheeses obtained in New York City and produced in Mexico. We have partnered with Mexican community groups and are disseminating information about *M. bovis* to the community. In addition, we are planning to investigate the prevalence of latent TB infection among US-born children of Mexican parents and the prevalence of consuming Mexican-produced cheeses among these children.

Though we did not anticipate a foodborne-transmission investigation as part of our mandate in TB control, the *M. bovis* investigation has alerted us to a mode of TB transmission that is rare overall in industrialized nations, but is significant in certain segments of our population.

—Submitted by Ann Winters, MD,
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School-Based TB Curriculum to Reach High-Risk Youth

Tuberculosis (TB): Education for Adolescents and Young Adults is a curriculum developed for high school students in response to data showing a high prevalence of TB disease and *M. tuberculosis* infection in specific adolescent populations. In 2003, San Diego County, California, reported 316 TB cases, of which 209 (66%) were in foreign-born persons. There were 11 cases (2.6% of total cases) in the 5- to 14-year-old age group and 43 cases (9.3% of total cases) in the 15- to 24-year-old age group. A school-based targeted testing project confirmed other local data sources showing rates of 20%-30% skin test positivity among high school–aged students born outside the United States, and 10%-15% positivity among US-born Latino teens.

An initial goal in San Diego County was to develop targeted testing and treatment programs within school districts having a large at-risk student body. While successful outcomes were realized in several schools, the models were difficult to sustain. Moreover, funds for targeted testing and treatment were discontinued after 2004. In anticipation of the end of formal testing and treatment programs, the San Diego TB Program sought to develop educational tools that could be used by schools to create awareness among students to increase TB knowledge,

assess their own risk, and promote testing and treatment.

The curriculum was developed and implemented through a collaboration between the County of San Diego Health and Human Services Agency TB Control Branch, the American Lung Association of San Diego and Imperial Counties, and the Sweetwater Union High School District. This school district is in southern San Diego County, a region with a large Latino population and a TB case rate of 20.1/100,000 population.

Implementation consisted of the following steps:

- Determine high schools with large populations of students in TB risk groups
- Create TB educational materials and an instructor's manual
- Focus on health classes in which teachers can incorporate the curriculum into existing communicable disease sessions
- Provide classroom observations to refine health teachers' techniques in delivery of the material
- Evaluate and elicit feedback from health teachers to refine course materials and content

Using a variety of methods, including lectures, interactive exercises, and group discussions, the students became actively involved in the learning process. Classroom kits contain easy-to-use materials including a poster, handouts, a TB education video, and a CD of the curriculum. Other available materials include the following:

- Educational slides and notes
- Activities and extra-credit materials
- Parent letter (optional)
- Pretest and posttest to evaluate students' increase in knowledge
- Risk-assessment form
- Learning chart
- Glossary of terms
- Abbreviations list
- Evaluation form for teachers
- TB resources
- Resources for medial care

Students who complete the curriculum will be able to

- Describe the difference between latent TB infection and active TB disease
- Recognize the signs and symptoms of TB disease
- Identify behaviors that reduce the risk of disease or transmission
- Self-assess for risk of TB
- Discuss issues related to TB with teachers, staff, and medical professionals
- Understand and demonstrate behaviors that prevent disease and speed recovery from illness

An evaluation component was conducted to assess the effectiveness of the curriculum. Evaluation from teachers demonstrated improved knowledge, increasing their ability to effectively teach the course; student involvement in group discussion; a 63% increase in student knowledge; and an increase in student ability to self-assess risk, identify symptoms, and access health care.

The school curriculum appears to be a useful tool for promoting and guiding training and education efforts for the control of TB. A future goal is to achieve sustainability by increasing the number of school districts that incorporate the TB curriculum into their standard health classes.

For more information on the curriculum, please contact Sacsy Sukcharoun by telephone: (619) 542-4105 or by e-mail: sacsy@lungsandiego.org or Diana Lobo by telephone: (619) 692-8627 or e-mail: Diana.lobo@sdcounty.ca.gov.

—Reported by Sacsy Sukcharoun, BS, Diana Lobo, BS, and Kathleen Moser, MD, MPH
San Diego TB Control Program

Second Meeting of the Pacific Island TB Controllers Association

In a previous issue of *TB Notes* (No. 2, 2004), we informed our partners of outcomes from the inaugural meeting of the Pacific Island TB Controllers Association (PITCA). Building on that successful meeting, we held the second meeting on December 7-9, 2004, convening again in Honolulu. We report on the outcomes from the second meeting.

The second PITCA meeting provided another invaluable opportunity for regional staff, technical consultants, and supporting agencies to network and to discuss program and laboratory accomplishments since the inaugural meeting. In an effort to maximize the meeting's effectiveness and to address other important public health issues for the region, this meeting was organized to allow for greater participation from regional staff and consultants from Pacific Island jurisdiction (PIJ) HIV/AIDS programs. As a result of this combined effort, participation in this second meeting was close to 100 persons, doubling last year's attendance. Representation included staff from the six US-affiliated PIJs (American Samoa, Republic of the Marshall Islands, Federated States of Micronesia, Republic of Palau, Guam, and Commonwealth of the Northern Mariana Islands), the State of Hawaii TB Control Program and Public Health Laboratory, the State of California Microbial Diseases Laboratory, the Federal Aviation Administration, the Diagnostic Laboratory Services of Honolulu, the World Health Organization (WHO) Western Pacific Regional Office (WPRO), the Secretariat of the Pacific Community (SPC) TB Section, the US Health and Human Services (HHS) Region 9 Office of Pacific Health and Human Services, the CDC Office of Global Health, the CDC Division of HIV/AIDS Prevention, and DTBE. The Pacific Island Health Officers Association (PIHOA) again provided conference support.

During the first day of the meeting, participants were provided an overview of health-related activities support by the HHS Region 9 Office of Pacific Health and Human Services for the region. This was followed by an update on the status of TB and HIV in the region. Keeping in line with core conference activities, several partners provided updates regarding laboratory practices for TB and HIV, the newly established PIHOA regional laboratory initiative, shipping protocols, and International Airline Transportation Association (IATA) regulations. The first day provided an excellent opportunity to present certificates of appreciation from CDC Director Julie Gerberding, MD, to several partners (Dr. Edward Desmond, State of California, Microbial Disease Laboratory; Duain Muraoka, Courier Corporation of Hawaii; Thomas Goob, Diagnostic Laboratory Services; and Patsy Ideue, PIHOA) who have been instrumental in supporting key activities in the region that have led to improved TB control practices for these jurisdictions and their communities. The first day closed with several presentations focused on health education activities for TB and HIV programs.

During the entire second day as well as half of the third day, HIV/AIDS program representatives met separately while the TB participants broke into program and laboratory working groups to review area-specific activities. Laboratory session participants focused on discussions and exercises related to AFB-smear microscopy quality assurance, and set up a mini-laboratory for program staff to use to conduct basic smear microscopy. Program session participants were provided an update by representatives from WHO, SPC, and CDC regarding an agency collaborative training session held in Yap State, Federated States of Micronesia, in Nov. 2004. This included a presentation from Dr. Zachary Taylor regarding a proposed protocol for treatment of TB patients in the Pacific region, based on a hybrid of WHO and CDC protocols and driven by the ability for PIJ TB programs to consistently use TB culture and susceptibility testing. Dr. Masae Kawamura gave a

Table 1. Tuberculosis in the US-Affiliated Pacific Islands, 2004

Jurisdiction	2004 Cases	2004 Case Rate	Population
US Pacific Basin[1]	163	41.4	394,000
Commonwealth of the Northern Mariana Islands	55	70.5	78,000
Guam	51	30.7	166,100
Republic of the Marshall Islands	41	74.0	55,400
Federated States of Micronesia[2] -- *Yap State*[3]	8	71.4	11,200
Republic of Palau	5	24.2	20,700
American Samoa	3	4.8	62,600
Hawaii[4]	116	9.2	1,262,840
United States[4]	14,511	4.9	293,655,404

1. Pacific Basin denominator excludes population estimates for the FSM states Chuuk, Kosrae, Pohnpei
2. CDC TB case reporting from FSM this year was limited to Yap State and thus reflects an undercount for FSM
3. Denominator data for Yap State obtained from www.fsmgov.org/info/people.htm
4. Provisional TB surveillance data for 2004, CDC, DTBE

presentation on the role of the Advisory Council for the Elimination of TB (ACET) and on the proposed scope of training and medical consultation services available from the San Francisco Regional Training and Medical Consultation Center (RTMCC). During working sessions, program and laboratory participants from the PIJs as well as from DTBE reported back on respective 2004 accomplishments and goals for 2005.

The afternoon of the third day allowed for HIV/AIDS and TB representatives to regroup and update each other on the activities from the last day and half. This was an excellent opportunity for staff of these disease-specific programs to come out of historically established working "silos," and allowed each program within the PIJs to not only hear about activities and accomplishments but also to set the framework to allow for increased collaboration within the PIJ HIV/AIDS and TB programs. Prior to concluding this workshop, Dr. Taylor presented accomplishment awards on behalf of DTBE and Dr. Castro to the PIJ TB program and laboratory staff to recognize program and laboratory accomplishments in 2004.

One of several important accomplishments in 2004 involves the reporting of TB cases from the PIJs to CDC TB surveillance system. Unlike the US jurisdictions, the six PIJs report TB case data to multiple health agencies: CDC, SPC (www.spc.int), and the WHO WPRO (http://www.wpro.who.int). Several of the PIJs implement the WHO DOTS protocol, which is also supported by the SPC, while other PIJs implement a more US-based approach. The WHO protocols, developed for resource-challenged programs, are different from the CDC/ATS/IDSA guidelines. As a result, the collection and reporting of TB surveillance data is not always as uniform across the PIJ programs as it is in the US jurisdictions.

During 2004, a total of 163 confirmed cases were reported in this region. This reflects case reports received from all PIJs with the exception of the States of Kosrae, Chuuk, and Pohnpei, which are part of the Federated States of Micronesia. The US Pacific Basin TB case rate (41.4/100,000) is 9 times greater that the reported US case rate (4.9) and exceeds by 5 times the TB rate of Hawaii, the closest US jurisdiction. The TB rate ranged from 4.8 in American Samoa to 74.0 in

the RMI. Among the 163 cases reported in the PIJs in 2004, five patients (3%) were diagnosed with multidrug-resistant (MDR) TB, the most dangerous form of TB disease.

The PIJ TB control programs are an important component of our domestic TB control and prevention agenda. Given this disparity in TB rates among PIJs when compared to US jurisdictions with similar case counts or similar populations, the DTBE Field Services and Evaluation Branch (FSEB) has initiated program and laboratory improvement efforts to intensify TB control in these regions which are challenged not only owing to their geographical separation from the United States but also to the limited health care resources available in these PIJs as compared to the US jurisdictions.

The FSEB PIJ TB improvement project includes

1. Providing technical assistance to collaboratively develop the respective national TB programs (DOT, surveillance, patient management, contact investigation, treatment protocols, and program evaluation with performance indicators);
2. Improving and sustaining local laboratory capacity (AFB-smear microscopy);
3. Supporting off-island reference laboratory testing (culture and sensitivity testing);
4. Fostering regional networking;
5. Collaborating with other Pacific-focused partners such as WHO, SPC, the Pacific Regional Laboratory Initiative (www.pihoa.org), HHS Region 9 Office of Pacific Health and Human Services, HHS Health Attaché for the PIJs, State of Hawaii TB Program and Laboratory Services, State of California Microbial Diseases Laboratory, and the Francis J. Curry Regional Training and Medical Consultation Center.

To continue supporting the need for regional networking, PIHOA and CDC are collaborating with HHS, San Francisco RTMCC, SPC, WHO, and the State of California to plan a third PITCA meeting December 6–8, 2005, and a separate training workshop for PIJ TB clinicians, scheduled for December 1–2, 2005, in Honolulu, Hawaii. For information regarding this proposed meeting, please contact Subroto Banerji (sbanerji@cdc.gov) or Andy Heetderks (aheetderks@cdc.gov) or send an e-mail to pitca@cdc.gov.

—Submitted by Subroto Banerji, MPH, PHA
Andy J. Heetderks, MPH, Team Leader
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Zachary Taylor, MD, Branch Chief
Div of TB Elimination

"Tuberculosis: Ancient Foe, Modern Scourge"

"Tuberculosis: Ancient Foe, Modern Scourge" is a backgrounder paper written for the Science Education for New Civic Engagements and Responsibilities (SENCER) project, a national dissemination project funded by the National Science Foundation. According to the SENCER website, "SENCER Backgrounders are intended to provide intelligent, general readers with high-quality syntheses of some of the complex, capacious civic issues that SENCER courses sometimes use to teach basic science." The backgrounder about TB, dated July 2004, describes "(1) the cause, diagnosis, and treatment of TB; (2) the epidemiology of TB in the United States and around the world; (3) the biology of TB and what we need to know about the biology of the tubercle bacillus and the disease it causes in order to develop tools that will enable us to respond more effectively to the global epidemic; and (4) the policies that support the control and prevention of TB in the United States and around the world." A pdf file of the paper can be downloaded from http://www.sencer.net/backgrounders.cfm.

—Submitted by Richard A. Fluck, PhD
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SAVE THE DATE

The **2005 Program Managers Course** is being held October 24–28, 2005, in Atlanta, Georgia. Course participants are nominated by the DTBE program consultant for their area. Please contact your DTBE consultant if interested in attending.

IUATLD North American Region Meeting

Beautiful Vancouver, Canada, was the location for the 9th Annual Meeting of the International Union Against TB and Lung Disease (IUATLD), North American Region (NAR), that was held February 23-26, 2005. The British Columbia Lung Association hosted the event. More than 250 attendees from around the globe were welcomed to the meeting by Dr. Amsa El Sony, President of the IUATLD, and Dr. Terry-Nan Tannebaum, President of the IUATLD-NAR. This year's meeting was dedicated to the memory of Dr. William W. Stead, in recognition of his monumental contributions to the understanding, treatment, and prevention of TB and his mentorship of a generation of doctors, nurses, and scientists, whom he inspired by his keen observations, his clinical and epidemiological research, and his masterful teaching.

The theme of the meeting, "Challenges to TB Control," was addressed with a thought-provoking and interesting selection of presentations, posters, and opportunities for networking, including an assembly of the Union's Nursing and Allied Health Assembly, during which DTBE's Maria Fraire, MPH, CHES, provided an overview and update on the Tuberculosis Education and Training Network. Session topics included Global Funding Initiatives, New Tools, Human Resources and Populations at Risk, and finally, Interactions: The Major Barrier to TB Control Globally, which featured a dynamic panel discussion moderated by Dr. Einar Heldal. Highlights of the meeting were a daylong capacity-building training course by the National Coalition for the Elimination of TB (NCET), a meeting of STOP TB Canada, and a reenactment of Dr. Robert Koch's Nobel Prize Award.

Copies of poster abstracts or other postconference inquiries may be directed to Menn Biagtan, MD, MPH, British Columbia Lung Association, 2675 Oak Street, Vancouver, BC Canada V6H 2K2.

The IUATLD next meets October 18-25, 2005, in Paris for the 36th Union World Conference on Lung Health. The North American Region of IUATLD will meet again in February 2006 in Chicago. For more information about either of these events, please visit www.iuatld.org.

—Reported by Linette McElroy
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TB BEHAVIORAL AND SOCIAL SCIENCE RESEARCH: NEW RELEASES

Proceedings of the Forum

- How well do patients understand latent TB infection and TB disease? Is knowledge associated with adherence?
- What are some ways to reduce perceived TB stigma among patients and their families?
- Does being culturally competent make a difference? How can health departments become sensitive to patients' needs without stereotyping?
- What provider behaviors best prevent TB outbreaks? How can they reduce diagnostic delay in patients with TB?

These research questions and many more were generated by participants at the *Tuberculosis Behavioral and Social Science Research Forum: Planting the Seeds for Future Research*. In December 2003, DTBE convened the Forum in Atlanta, Georgia, to address the need for further TB behavioral and social science (BSS)

research, as called for in the Institute of Medicine's 2000 report *Ending Neglect: The Elimination of Tuberculosis in the United States.* The Forum brought together over 60 academicians, researchers, TB controllers and program staff, and CDC representatives. The goals of the Forum were to identify and prioritize TB BSS research gaps, and to foster productive partnerships and ongoing communications between national, state, and local governmental and nongovernmental BSS researchers focusing on TB.

BSS research has the potential to significantly strengthen efforts to prevent and control the spread of TB. Research is needed to understand the behaviors of both patients and providers, and the impact of their actions on TB-related care seeking, diagnosis, treatment success, and prevention. In addition, research focusing on the health care service delivery system and its organizational structure will further inform this research by providing the context within which patients and providers operate.

The newly-released Forum Proceedings document includes summaries of presentations and discussions, as well as a synthesis of research needs and priorities identified by attendees. The information gathered from the Forum reaffirmed the ongoing need for BSS research to improve TB prevention and control. It is CDC's hope that the Forum Proceedings will be widely used to plan BSS research and programmatic activities to enhance TB prevention and control.

To view the Forum Proceedings, go to the following link:
http://www.cdc.gov/nchstp/tb/pubs/Behavioral_Forum_Proceedings/TOC.htm

(Print versions will be made available upon request.)

Tuberculosis Behavioral and Social Science Listserv Launched

DTBE and the CDC National Prevention Information Network (NPIN) launched the TB Behavioral and Social Science (TBSS) listserv in April 2005. The purpose of the TBSS listserv is to provide an unmoderated forum for exchanging information and discussing topics related to behavioral and social science issues pertinent to TB control. The listserv will facilitate communication among subscribers on current TBSS research activities, literature, resources, meetings, funding opportunities, and other relevant information.

To join the TB Behavioral and Social Science listserv, go to the following link:
http://cdcnpin.org/scripts/tb_behavioral_science.asp

—Reported by Cathy Rawls, MPH, CHES, Nick DeLuca, MA, PhD, and Robin Shrestha-Kuwahara, MPH
Div of TB Elimination

TB EDUCATION AND TRAINING NETWORK UPDATES

Member Highlight

Paul Britton, RN, is the State TB Controller, TB Control Program Manager, and Nurse Consultant for the Indiana State Department of Health. He has a BS degree in nursing and an MS degree in political science.

Paul is responsible for oversight of case management, technical assistance to local health departments, and oversight of all TB surveillance activities. He oversees educational program development for regional conferences that are sponsored by the TB control program. Paul worked previously in HIV/AIDS surveillance and in health regulatory affairs with the Indiana State Department of Health before taking over the TB control program in November 1999.

Paul first learned of TB ETN from DTBE and has been a member since its inception; you might say that he is an "original." He joined TB ETN to remain on the forefront concerning new TB educational tools, resources, and developments. He is also a member of the Membership and Communications subcommittee. He joined this subcommittee to help spread the word about TB ETN and what it can do for his colleagues. In the next couple of years, Paul hopes that TB ETN will increase its membership. He also hopes that TB ETN will increase the amount of educational reference materials that are available through the TB ETN website, a reflection of his enthusiasm for computers. In his spare time Paul also enjoys reading and playing the guitar.

Recently, Paul was responsible for developing folding pocket reference cards for LTBI and TB disease and a TB Control and Prevention Manual for his state program. He also works with the American Lung Association of Indiana to put on a TB Symposium for health providers and local health department staff every other year. "We will soon be planning one for October of this year," Paul informed us.

If you'd like to join Paul as a TB ETN member and take advantage of all TB ETN has to offer, please send an e-mail requesting a TB ETN registration form to tbetn@cdc.gov. You can also send a request by fax at (404) 639-8960 or by mail at

TB ETN
CEBSB, DTBE
CDC
1600 Clifton Rd., NE, MS E10
Atlanta, Georgia 30333

If you would like additional information about the TB Education and Training Network, visit the website at http://www.cdc.gov.nchstp/tb/TBETN/default.htm.

—Reported by Regina Bess
Div of TB Elimination

Cultural Competency Update

The TB ETN Cultural Competency Subcommittee has been busy developing and conducting a new needs assessment. After some consideration, it was decided that a small, informal needs assessment would be conducted through telephone calls to the Cultural Competency subcommittee membership. This needs assessment will help determine

- The extent to which TB ETN members are aware of the cultural competency subcommittee and its activities
- The level to which cultural competency subcommittee activities and projects have met the needs of TB ETN members
- Specific needs or ideas for new Cultural Competency subcommittee activities and projects

Additionally, the subcommittee would like to increase the level of participation in monthly conference calls. To that end, members were asked about barriers to participation and were asked for ideas to encourage each of them to be a more active participant. The needs assessment was completed in May 2005 and the findings were reported at the TB ETN annual conference in August 2005.

Other Cultural Competency subcommittee activities have included the following:

- Planning for the 2005 TB ETN conference, which continues to have a cultural competency component.
- Reviewing ethnographic profiles developed by a CDC research team. Feedback is currently being incorporated into the draft profiles.
- Continuing to review cultural competency tools and add these tools to the cultural competency resource list, which will be distributed at the TB ETN conference.
- Continuing to assist in identifying TB cases that involve cultural challenges for the New Jersey Medical School National Tuberculosis

Center's (NJMS NTBC) Cultural Competency Newsletter. The subcommittee is interested in highlighting the wonderful work being accomplished in TB control, so if you or someone in your program has a case (past or present) involving cultural challenges, we would be interested in hearing about it. Please contact Lauren Moschetta at (973) 972-1261 or moschelb@umdnj.edu for more information.

Cultural Competency Tip:

Identify the positive values behind behaviors we perceive as "different." This "reframing" of cultural differences will help when negotiating workable solutions between individuals or systems where cultural issues present a challenge.

From CRASH Course in Cultural Competency Skills, National Center for Primary Care at Morehouse School of Medicine with support from Pfizer.

—Submitted by Lauren Moschetta, MA
Training & Consultation Specialist
Northeastern National TB Ctr
at NJ Medical School

TB EPIDEMIOLOGIC STUDIES CONSORTIUM UPDATE

Task Order 4 Update: HIV Counseling, Testing, and Referral for TB Contacts

The New York City Department of Health and Mental Hygiene (NYCDOHMH) Bureau of TB Control implemented TBESC Task Order 4 in collaboration with CDC. The study was designed to identify and target HIV-infected contacts to infectious TB patients, a group at great risk of developing TB disease. In 2001 and again in 2003, CDC guidelines stated that HIV counseling, testing, and referral (CTR) should be routinely recommended to TB suspects, TB patients, and their contacts.[1,2] However, for many TB programs, provision of HIV testing has not been a routine part of contact investigation procedures.

Close contacts reported in Manhattan, New York City, from December 2002 through November 2003 were offered HIV CTR through the study. Objectives were to increase HIV CTR and knowledge of HIV serostatus among close contacts, screen all HIV-infected contacts for active TB, prevent progression to active TB among HIV-infected contacts through LTBI treatment, prevent additional AIDS opportunistic infections, and provide better care of persons living with HIV disease by referring them to and assisting them access care for HIV infection.

Data collection was finalized in February 2004. Analyses included a comparison of contacts who had received HIV tests, either recently or previously, to those contacts who had not received HIV tests; an assessment of factors associated with acceptance of testing; a description of TB outcomes; and an estimate of project costs. An article has been prepared for submission to a peer-reviewed journal. Of 614 contacts, 569 (93%) were provided information about HIV infection and offered HIV CTR. Of the 569, 29% were newly tested, 10% were previously HIV-tested (with 24 found to be HIV infected), and 61% were not tested for HIV. Newly HIV-tested contacts (vs. not tested) were more likely to be aged 18–24, Hispanic, or non-Hispanic black. Of eligible HIV-infected contacts, 56% started and half completed treatment for latent TB infection. It cost $1 per patient to provide HIV information and $5–$8 to offer HIV CTR. The project increased HIV counseling and testing of high-risk groups and improved TB screening of those found to be HIV infected.

—Reported by Suzanne Marks, MPH
Div of TB Elimination
and Jiehui Li, MBBS, MS
NYC Dept. of Health and Mental Hygiene

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1. CDC. Revised guidelines for HIV counseling, testing, and referral. *MMWR* 2001; 50 (RR 19): 1-57.
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CLINICAL AND HEALTH SYSTEMS RESEARCH BRANCH UPDATES

TB Trials Consortium (TBTC) Study 27 and 28 Update

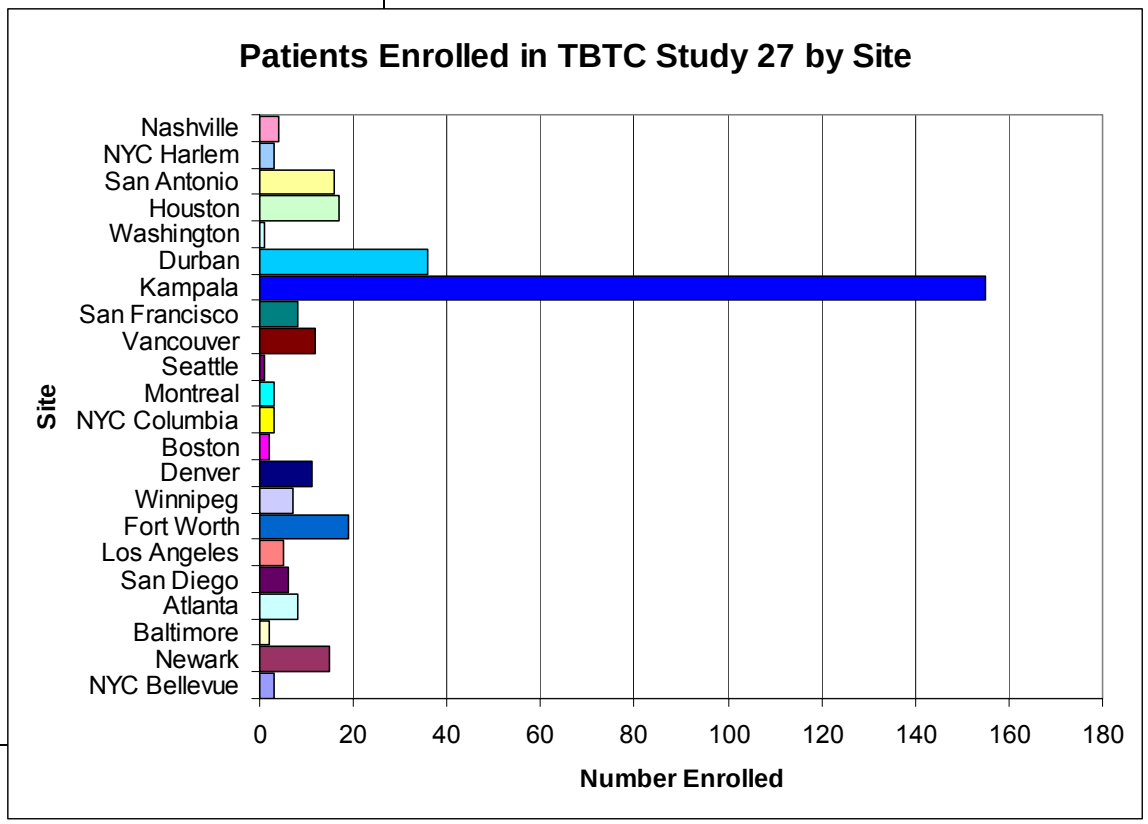
TBTC Study 27, "An Evaluation of the Activity and Tolerability of Moxifloxacin During the First 2 Mos. of Treatment for Pulmonary Tuberculosis," enrolled its first patient on July 25, 2003, and completed enrollment on March 14, 2005. Initially proposed to study 300 patients and to take 3 years to complete, the final enrollment was 336 patients. Findings from preliminary analyses were presented at the TBTC meeting and American Thoracic Society (ATS) conference in May 2005. Approximately half of the enrollments occurred at the TBTC site in Kampala, Uganda, with the next largest enrollment occurring at the site in Durban, South Africa.

At the end of study enrollment, a large amount of generic ethambutol, good through Nov. 2005, remained from the original bulk purchase from Versapharm. The surplus was offered to the African sites, whose high case rates would enable them to use it quickly in their routine clinical practice; the offer was accepted by the Uganda site. At the end of March, after completing the necessary paperwork, the CDC pharmacy sent 36,000 400 mg ethambutol tablets to Uganda, where they were very much appreciated. For readers who may wonder, matching placebo tablets also left over from Study 27 were destroyed according to CDC pharmacy drug services protocol.

TBTC Study 27 compared moxifloxacin with ethambutol during the first 2 months of therapy. Study 28, "Evaluation of a Moxifloxacin-Based, Isoniazid-Sparing Regimen for Tuberculosis Treatment," will compare moxifloxacin with isoniazid during the first 2 months of therapy. It has been approved by the CDC IRB and is in the process of IRB review locally by consortium sites. Enrollment starts in early fall 2005.

See *TB Notes* No. 4, 2004, for more detail on TBTC Study 27 and 28 at http://www.cdc.gov/nchstp/tb/notes/TBN_4_04/Clinical_TBTC.htm.

—Reported by Stefan Goldberg, MD
Div of TB Elimination



Collaboration to Improve TB Services for HIV-Infected Persons

In persons with latent TB infection (LTBI), coinfection with HIV is one of the highest risk factors for development of active TB. In August 2003, the Health Systems Research Team in the Clinical and Health Systems Research Branch of DTBE began a collaborative project with the HIV/AIDS Bureau of the Health Resources and Services Administration (HRSA). The purpose of the collaboration is to help improve the provision of TB services to HIV-infected persons who receive care through Ryan White Comprehensive AIDS Resources Emergency (CARE) Act grantees. The overall aim of the project is to help reduce TB incidence among persons living with HIV/AIDS by facilitating improvements in the detection and treatment of TB and LTBI.

Guidelines have been issued by the US Public Health Service (USPHS) and the Infectious Diseases Society of America (IDSA) for preventing opportunistic infections among HIV-infected persons.[1,2] Individuals newly diagnosed with HIV infection should receive a tuberculin skin test (TST) soon after HIV diagnosis and be clinically evaluated for TB disease if they have a positive TST result or have TB symptoms. If there is no evidence of TB disease (and no history of treatment for TB or LTBI), persons with a positive TST result should receive LTBI treatment (recent contacts to TB patients should be treated regardless of TST result). The guidelines also recommend annual repeat testing for persons with negative TST results who may be at a substantial risk of TB exposure. Clinicians should also consider repeat testing if immune function has improved owing to HIV chemotherapy.

Currently, there is limited information concerning the extent to which TB screening and treatment services are being implemented by HIV service providers throughout the United States. A study at three US sites by Lee revealed that about 50% of HIV-infected persons were screened for LTBI, with a mean time of 6 months between HIV diagnosis and TST.[3] Approximately 7% had positive TST reactions, and 59% of these individuals were given LTBI treatment. In a study among New York City HIV clinics, Sackoff et al. revealed that 56% of patients with an indication for a TST had a current test result. They found that 41% of patients with TST-positive results completed a 12-month regimen for LTBI.[4] Finally, the CDC Supplement to HIV/AIDS Surveillance project found that from 1995 to 1999, 80% of eligible HIV/AIDS patients from 12 state or local health departments reported ever receiving a TST.[5] Of the 8% who had a positive TST, 27% did not receive LTBI treatment. The researchers concluded that current rates of LTBI testing and treatment did not fully meet the USPHS/IDSA guidelines.

The HIV/AIDS Bureau (HAB) of HRSA administers the Ryan White CARE Act. The CARE Act funds primary health care and support services through four titles for approximately 571,000 persons per year, or possibly 75% of HIV-infected persons who know their HIV status. Those who receive services through CARE Act grantees are likely to be persons with limited access to health care and may be at high risk for TB. Because HRSA/HAB has access to this high-risk population and because DTBE has prioritized TB prevention among HIV-infected persons, the two agencies joined together in this collaborative project. The relationship between HRSA/HAB and DTBE was formalized in a Memorandum of Understanding (MOU), which facilitates study collaboration and enables the exchange of information and resources.

The project is divided into two parts. Part One, recently completed, identified the HRSA/HAB policies, procedures, and baseline levels of TB screening and treatment through extant data reported to HRSA/HAB by CARE Act grantees. The specific study questions for Part One were

- What written policies are in place for HAB grantees to provide TB services?

- What is the current rate of TB screening and treatment of HIV-infected clients at HAB grantees?
- Based on data from CARE Act Data Reports and earlier Title III Program Data Reports, which HAB grantees have achieved high rates of TB screening and treatment?

The methods employed for Part One included the establishment of the MOU; interviews with HRSA/HAB headquarters staff about TB services, policies, and reporting; and an informal collection of written policies, procedures, and training curricula from Title III and IV clinics. Title III supports outpatient primary medical care and early intervention services to people living with HIV/AIDS through grants to public and private nonprofit organizations. Title IV supports coordinated primary care services and access to research for children, youth, and women with HIV disease and their families. CDC project staff also analyzed data from all reporting grantees through the CARE Act Data Report (CADR) on TB screening and treatment services. TB variables included the number of clients who received a TST, received treatment owing to a positive TST, or were diagnosed with active TB in the reporting year. HAB has revised its CADR as of 2005 to include additional TB variables, such as completion of LTBI treatment, partly as a result of this project. The results of Part One were presented at the 2005 National TB Controllers Association in Atlanta, Georgia.

The primary objective of Part Two is to facilitate improvement in the detection and treatment of LTBI and TB by developing knowledge of successful TB services provision at selected CARE Act Title III grantees, strengthening the capacity of Title III service providers, and improving collaboration between Title III grantees and TB providers. Proposed study questions for Part Two are

- How do the selected Title III grantees successfully provide TB prevention services?
- What ecological and program characteristics and activities are associated with higher rates of TB screening and treatment at the selected Title III HIV clinics?
- How much does it cost to provide TB screening and treatment services at the selected Title III HIV clinics?

A total of six CARE Act Title III grantees in New York City, Los Angeles, and Miami, all areas with high HIV/TB co-morbidity, will participate in the case studies. Using qualitative and quantitative methods, CDC project staff will document the range of program designs and practices that have achieved success in TB service provision. Methods will include 1) key informant interviews with HIV clinic staff; 2) chart abstractions of a random sample of Title III HIV-infected clients; 3) a review of written TB policies, protocols, and other documents relevant to TB services provision; 4) interviews with clinic staff about cost of providing TB screening and treatment services; 5) focus groups with a randomly selected sample of clients; 6) observation of program operations; 7) and if appropriate, interviews with staff members from collaborating TB programs.

After results are shared with HAB and study sites, HAB in coordination with CDC will develop a dissemination strategy that identifies potential users and targets findings and mechanisms appropriate for each group. Depending on the nature of the findings, the dissemination strategy may involve HAB's AIDS Education and Training Centers (AETCs). Study findings will reach a wider audience through CDC and HAB publications and a peer-reviewed journal.

In the final phase, HAB project staff will develop an implementation strategy in collaboration with CDC. It is intended that this strategy will promote the use of study findings by Title III HIV providers beyond what could be expected from publication in a peer-reviewed journal. Linkages between Title III HIV providers, AETCs, and DTBE may be established to develop protocols or guidelines for TB services provision improvement. Findings from the study will be considered for

incorporation into training and technical assistance activities by HAB's 11 regional AETCs and their local performance sites as deemed appropriate given the study results. Findings may also be incorporated into training materials and curricula developed by the TB Regional Training and Medical Consultation Centers for broad use by TB providers. DTBE's Field Services and Evaluation Branch will be consulted to help establish referral mechanisms between HIV providers and local TB providers. Lastly, ongoing information exchange mechanisms will be developed between CDC and HAB for sharing of TB screening and treatment data to monitor TB services provision over time.

In summary, HAB's access to this at-risk population provides an opportunity to prevent TB morbidity and mortality and to improve TB services for people living with HIV/AIDS. This collaborative project addresses priorities of both CDC and HAB, as well as the Institute of Medicine[6] and the Federal TB Task Force.[7] In addition, this collaboration provides an opportunity for staff members from HAB and CDC to build professional relationships and sets the stage for future partnerships that further both agencies' goals.

—Reported by Heather Joseph, MPH, Cathy Rawls, MPH, CHES, and Suzanne Marks, MPH
Div of TB Elimination

For additional information about this study, please contact the Project Officers: Suzanne Marks (SMarks@cdc.gov) or Heather Joseph (HJoseph1@cdc.gov) at DTBE or Alice Kroliczak (Akroliczak@hrsa.gov) or José Rafael Morales (jmorales@hrsa.gov) at HRSA/HAB.

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1. CDC. Guidelines for preventing opportunistic infections among HIV-infected persons—2002: Recommendations of the US Public Health Service and the Infectious Diseases Society of America. MMWR. 2002:51(RR-8):8-10.
2. Prevention and treatment of tuberculosis among patients infected with human immunodeficiency virus: Principles of therapy and revised recommendations. MMWR 1998; 47(RR-20).
3. Lee LM, Buskin SE, and Morse A. Low rates of tuberculin skin testing among persons with diagnosed HIV infection, US, 1995-1997. Presented at the 14th International AIDS Conference. Barcelona, Spain; July 7-12, 2002.
4. Sackoff JE, Torian LV, Frieden TR, Brudney KF, Menzies IB. Purified protein derivative testing and tuberculosis preventive therapy for HIV-infected patients in New York City. AIDS. 1998;12:2017-2023.
5. Campsmith ML, Nakashima AK, and Burgess D. Self-reported TB testing and preventive therapy in an HIV-infected population: Results from an interview project in the United States. Presented at CDC. Atlanta, GA, 2000.
6. Institute of Medicine. *Ending Neglect: The Elimination of Tuberculosis in the United States.* Washington, DC: National Academy Press. 2000.
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INTERNATIONAL ACTIVITIES

BOTUSA's Legacy During the First Decade: A Personal Reminiscence and Perspective on Tuberculosis

Presented by Kenneth G. Castro, MD

BOTUSA's 10th anniversary was commemorated with a conference on TB and AIDS programs and research in Gaborone, Botswana, on March 1, 2005. Following are Dr. Castro's remarks at the conference.

It is hard to believe that more than 10 years have elapsed since CDC staff members Drs. Kevin DeCock, Robin Huebner, and Nancy Binkin, and Mr. Harry Stern participated in the Botswana Program review organized by then Botswana's Permanent Secretary of Health Dr. Eddie Maganu. Thus began the collaboration between CDC and the Botswana Ministry of Health.

That TB Program review raised awareness of how, in spite of excellent achievements by

Botswana, gains in TB control were being eroded in association with growing numbers of persons infected with HIV, the etiologic agent of AIDS.

In 1993 I joined CDC's Division of Tuberculosis Elimination (DTBE) following several years of epidemiologic work with CDC's Division of HIV/AIDS, where I had gained an appreciation of the extraordinary benefits of field work, as demonstrated by *Projet SIDA* in Kinshasa, Zaire (now the Democratic Republic of Congo) and *Projet Retro-CI* in Abidjan, Ivory Coast. I was therefore eager to promote the establishment of similar field sites by DTBE to focus on collaborative research projects in TB prevention and control. Subsequent discussions explored the feasibility of initiating a collaborative venture between CDC's DTBE and the Botswana Ministry of Health to investigate risk factors associated with HIV and *Mycobacterium tuberculosis* coinfection. Soon it became evident that both CDC and Botswana's Ministry of Health (MOH) were facing a unique opportunity for CDC and MOH to engage in epidemiologic projects of mutual interest, aimed at improving our understanding and providing the scientific basis for public health policies to reduce the suffering caused by the intersection of TB and HIV.

Dr. Robin Huebner, who years earlier had served as a Peace Corps volunteer in Botswana's TB control program and worked with Dr. Maganu, became the first CDC DTBE assignee to live in Botswana and initiate the collaboration. To reflect the partnership between Botswana and the United States of America, the project was named BOTUSA. From its earliest stages, all the research agenda was jointly set by CDC staff (Drs. Huebner, Binkin, Castro) and Dr. Maganu from MOH, with input from Dr. Themba Moeti, Dr. Howard Moffat at Princess Marina Hospital, Dr. Nick Hone at Nyangabgwe Hospital in Francistown, and Dr. Rumisha as well as Mr. B.S. Koosimile of the Botswana TB Control Program. Epidemic Intelligence Service (EIS) Officer Dr. Shahin Lockman and Medical Officer Dr. Jordan Tappero implemented the first series of operational research projects. Activities continued to grow, and Dr. Huebner was later succeeded by Dr. Tom Kenyon and Ms. Ethleen Lloyd. During Dr. Kenyon's tenure as CDC assignee to BOTUSA, the US government initiated the LIFE (Leadership and Investment in Fighting an Epidemic) Initiative, and CDC's Global AIDS Program (GAP) came to be. As GAP started a series of field sites throughout Africa, BOTUSA's oversight was transferred from DTBE to GAP – only after several soul-searching and reassuring conversations with Dr. Eugene McCray. Dr. Elizabeth Talbot was selected by DTBE and assigned to BOTUSA to ensure the continuation of high-priority, TB-specific collaborative research activities within the context of GAP. Over time, Dr. Kenyon was succeeded by present BOTUSA CDC Director Dr. Peter Kilmarx, and Dr. Taraz Samandari followed Dr. Talbot. The collective work of these individuals, along with that of local key medical officers, research nurses, medical students, EIS Officers, outreach and district workers, and TB patients in Botswana have yielded a magnificent body of work relevant to the prevention and control of TB in a country also being ravaged by HIV.

BOTUSA's 10-year history and immense contributions to public health are extensive, reflective of consistently high productivity. Because of space limitations, I will limit myself to brief descriptions of ten selected projects.

1. The electronic TB register (ETR) project and surveillance strengthening were some of the first areas of collaboration. The ETR has facilitated more rigorous and comprehensive TB case recording and reporting than was previously possible in Botswana. Patient-based data are recorded and reported at the district level and then transmitted centrally. It has also facilitated a number of operational research projects focused on addressing TB program issues. As a result of Botswana's experience with use of the electronic TB register, seven other sub-Saharan African countries (including South Africa and

Tanzania) decided to adopt ETR and have been using it very successfully.

2. Autopsy studies of adults and children who died with HIV infection in the mid/late 1990s suggested that the spectrum of HIV-associated opportunistic pathogens would not be adequately covered with cotrimoxazole preventive therapy (CPT). These data enabled Botswana to develop a data-based policy that does not rely on CPT, unlike other countries pressured to adopt this intervention on the basis of findings demonstrating a beneficial effect of CPT in Ivory Coast and Malawi.
3. Operational research identified alcohol consumption as a strong risk factor for HIV among TB patients, thus drawing attention to the need to address this risk during HIV prevention messages in Botswana.
4. In trying to explain relatively high rates of defaults observed among HIV-infected persons with TB, research showed a large misclassification bias occurs in labeling TB cases as defaulters; many "defaults" are actually deaths. This provided a compelling argument to offer antiretroviral (ARV) treatment for HIV-infected TB patients.
5. A 3-year annual rate of tuberculosis infection (ARTI) study demonstrated how a novel sampling technique reduced the necessary sample size to obtain an accurate estimate of ARTI. This study was carried out against the backdrop of ARV program implementation and expansion, and will be integrated over the longer term in general program activities (to be performed every 3–5 years). This activity provides a key tool for measuring the potential effect of ARVs on TB transmission.
6. Serodiagnostic tests for TB have been field-tested among adults and children in Botswana. The evaluated tests did not pan out as viable; however, we learned that 15% of all microbiologically confirmed adult TB cases were detected through blood culture alone. Most developing countries rely solely on acid-fast sputum smear microscopy as the basis for diagnosing TB. These BOTUSA data strongly suggest that TB is being underdiagnosed in settings of high-background HIV infection such as Botswana, and suggest that improvements in laboratory capacity are required to enhance the ability to diagnose TB in persons with HIV.
7. A novel strategy of performing rapid HIV testing on TB patient sputum specimens was validated through BOTUSA, and showed that Oraquick® used in this manner had about 94% sensitivity, and provided important population-based HIV prevalence data among persons with TB. Simultaneously, it was acknowledged that the sensitivity was insufficient for relying on this test as the basis of an individual's HIV diagnosis. As part of the 2002 anti-TB drug resistance survey, HIV testing was anonymously performed on approximately 2000 TB patients included in the survey. This strategy resulted in the first representative, population-based data of HIV prevalence among TB patients in Botswana (and in sub-Saharan Africa); 60% of TB patients were infected with HIV—somewhat lower than the 70%–80% previously reported in hospital-based surveys. This strategy is being used more widely now in a number of settings following the example of Botswana.
8. Results from the BOTUSA 2002 anti-TB drug resistance survey confirm increasing trends in anti-TB drug resistance in Botswana—the only sub-Saharan country with trend data—including any drug resistance, isoniazid, and streptomycin among new patients. Changes in multidrug-resistant TB are not statistically significant, but suggest a worrisome trend among new patients, from 0.2% in 1996 to 0.5% in 1999, and to 0.8% in 2002. In the past, Botswana has not relied on fixed-drug combination (FDC) tablets for treatment of patients with TB. These data have provided an impetus for Botswana to introduce FDCs for TB patient care as an effort to limit selective drug treatment interruptions and thus control further emergence of drug resistance.

9. An isoniazid preventive therapy (IPT) program was successfully piloted by MOH and BOTUSA in 2000–2001; approximately 1000 attendees to a voluntary counseling and testing (VCT) clinic who were identified as HIV infected were screened, and approximately 600 ultimately initiated IPT. Completion was 70%—better than the rates observed in other WHO-supported ProTEST pilot projects. This pilot IPT project also served to demonstrate that a symptom screen was nearly as sensitive as performing a chest radiograph to rule out active TB. This information was published in *The Lancet*. Furthermore, the results of the IPT pilot project provided the basis for the MOH decision to proceed with implementation of IPT in 2002. As such, thousands of persons have been screened and started on IPT, now being delivered through the general clinic network. Close monitoring and evaluation of the program as it continues to expand will be essential to ascertain that patients are being screened appropriately to rule out the presence of active TB and thus prevent the unintended use of inappropriate isoniazid monotherapy in persons requiring multidrug regimens for active TB. To facilitate better monitoring and evaluation capacity, BOTUSA is assisting MOH with the development of an electronic recording and reporting data system and will assist with another national anti-TB drug resistance survey in 2005 to closely monitor isoniazid resistance trends.
10. A critical trial for Botswana and the international community was just launched in November 2004 comparing 6-month IPT to life-long (3 years). Botswana currently follows the UNAIDS recommendation of 6-month duration of IPT, but is keen to learn if longer duration in a setting where patients are likely re-exposed to persons with active TB will result in measurable improvements in protecting highly vulnerable HIV-infected persons against TB.

As we celebrate the achievements of the past decade, it is most appropriate to assess the present situation objectively and identify future challenges to TB prevention and control. Botswana is acknowledged to represent one of the countries with the highest incidence and notification rates of TB worldwide. Paradoxically, in the 1980s Botswana had implemented solid TB control measures, only to be soon undermined by the epidemic of HIV, and possibly by incipient complacency in TB control. Despite the country's historically strong record of TB control, resource commitments for the TB program have diminished over time as the government has had to grapple with the HIV epidemic. For example, the number of TB-specific district-level coordinators has been greatly reduced such that now only a few districts have staff fully dedicated to TB control. The human-resource deficit is costing the TB program greatly, leading to the inability to sustain the previous high quality of services. Without the ability to make certain that all persons with active TB receive their treatment until cured, interruptions in therapy and suboptimal regimens are probably contributing to the growing burden of drug resistance. Future challenges to BOTUSA include the need to help with the necessary training, education, and building of capacity to deliver high-quality public health services aimed at reducing the suffering and premature deaths associated with the coepidemics of TB and HIV.

It is my sincere hope that the next decade of collaboration in BOTUSA continues to provide relevant research findings for sound policies coupled with local capacity building to make a difference in the lives of those afflicted with TB and HIV.

I am grateful to Dr. Peter Kilmarx, CDC GAP, BOTUSA Director, for his leadership and for the invitation to share this perspective on the occasion of the tenth anniversary of the BOTUSA Collaboration, to Drs. Charles Wells and Lisa Nelson, CDC DTBE, International Research and

Programs Branch, for much of the information described above and for their insightful comments, to Dr. Taraz Samandari for his outstanding work in Botswana, to President Festus Mogae for his enlightened leadership and commitment to the well-being of his country, to all those mentioned above and others who I have inadvertently omitted for their key roles in making BOTUSA a reality, and to the very fine people of Botswana who have helped BOTUSA become a "value-added" contribution for the benefit of so many others. Pula!

TRAINING AND EDUCATIONAL NEWS AND MATERIALS

Products from the New Jersey Medical School National TB Center

The following new products are available from the New Jersey Medical School National Tuberculosis Center. All of these products may be accessed from the Center's web site at http://www.umdnj.edu/ntbcweb or by calling (973) 972-0979.

Tuberculosis Contact Investigation in Congregate Settings: A Resource for Evaluation. This resource is designed for use in the evaluation of TB contact investigations in congregate settings. It provides explanatory text and tools for assessing health care worker performance and skills as well as programmatic outcomes of contact investigations in congregate settings. Three evaluation forms are available for downloading on the website.

Basic Epidemiology for Tuberculosis Program Staff. This resource provides a background on basic epidemiology for TB program staff. The information in this guide will assist in analyzing and making practical use of data, assessing current and evolving trends in TB morbidity, identifying risk groups, and determining where to allocate staff and resources.

Tuberculosis Case Management for Nurses: The Facilitator's Guide. This resource outlines the process of planning and conducting a 2-day, interactive workshop for TB nurse case managers and is available as an online product. Several of the sections are PDF files and, for sections that are designed to be modified, the files are in MS Word. Contents include Developing the Workshop, Workshop Simulated Patient Exercises, Workshop Handouts, Small Group Exercises, and Facilitator's Binder.

*Incorporating Tuberculosis Education into Nursing School Curricula.*This online resource is designed to provide nursing school faculty with materials they can use to introduce students to the management of TB disease and infection. Part one is a Faculty Guide which provides an overview of TB, its pathogenesis and transmission, diagnostic criteria, and treatment. Part two are modules which contain learning objectives, PowerPoint® slide presentations, case study and discussion questions, suggested readings, and suggestions for clinical rotations. Modules include Fundamentals of Tuberculosis for Community and Public Health Nurses, Fundamentals of Tuberculosis Nursing in the Hospitalized Adult Patient, Fundamentals of Tuberculosis Nursing in Children and Adolescents, Understanding the Pathophysiology of Tuberculosis, and Pharmacology of Anti-Tuberculosis Medications.

*Implementing Legal Interventions for the Control of Tuberculosis.*This resource describes a process by which TB programs can effectively implement legal interventions to gain and maintain the adherence of their patients. Legal interventions are described as a method of last resort, to be implemented in the least restrictive environment possible, while balancing the rights of the patient with those of the public. As such, the resource discusses elements that every TB treatment regimen should include, such as case management and the use of incentives and enablers. Included are teaching cases and

sample letters that TB programs can adapt to suit local needs.

—Submitted by Rajita Bhavaraju, MPH, CHES
Northeastern National TB Ctr
at NJ Medical School

NEW CDC PUBLICATIONS

CDC. Human tuberculosis caused by *Mycobacterium bovis*—New York City, 2001–2004. *MMWR* 2005 June 24; 54 (24): 605-608.

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PERSONNEL NOTES

Victor Alcantara, who has been working as a Public Health Educator in the Marion County Health Department, Salem, Oregon, has been selected for the Field Services and Evaluation Branch (FSEB) Public Health Advisor position assigned to West Palm Beach, Florida. Victor comes to DTBE with previous experience in TB, having handled TB outreach work in his last assignment. Oregon is working toward the integration of its TB/HIV/STD programs, and Victor was the first TB Disease Intervention Specialist working within the three programs. Prior to his time in Oregon, Victor worked in the STD program of the Utah Department of Health as a Community Health Specialist. In addition to his previous public health experience, Victor brings to DTBE his Air Force military and medical experience, having worked in a Squadron Medical Element position (nonmilitary, similar to an Emergency Medical Technician position) from 1989 to 1994. Victor began in his new position on July 25, 2005.

B.A. Blackledge has joined DTBE in the Office of the Director. She joined us June 26 and will provide expertise in contracting and budget analysis. Prior to coming to DTBE, B.A. worked as a Public Health Specialist with the National Immunization Program (NIP) for 3 years, where her main responsibilities included assisting local, state, and federal clients with their immunization registries and assisting clients attain immunization goals for the program. Prior to working at NIP, she worked in CDC's Procurement and Grants Office (PGO) as a Contract Specialist for 8 years. She has a total of approximately 20 years of experience with various types of contracts and task orders including construction, research and development, and information technology contracts, and has worked with a number of procurement agencies such as HHS, the General Services Administration, and the Veterans Administration.

Alan B. Bloch, MD, MPH, Captain, US Public Health Service, retired from CDC and the Commissioned Corps on August 1 after 25 years of federal service. Alan started at CDC in 1980 as an Epidemic Intelligence Service Officer in the Immunization Division, working in the field of measles elimination. He was a Preventive Medicine Resident from 1981 to 1983; while assigned to the Georgia Division of Public Health, he conducted an outbreak investigation of waterborne hepatitis A, resulting in one of the first environmental isolations of the hepatitis A virus from a water source linked to an outbreak. In 1983, Alan joined the Division of TB Control. From 1983 to 1985, he served as Chief of the Statistics and Analysis Section in the Program Services Branch. In the spring of 1985, using the weekly TB notifications to CDC, he identified an abrupt halt in the decades-long decline of TB morbidity, accompanied by increased TB morbidity in states with AIDS epidemics. From 1985 to 1990, Alan served as the first Chief of Surveillance and Epidemiologic Investigation Branch. During that time, Alan helped develop the initial surveillance, epidemiologic, programmatic, and research

agenda related to HIV/AIDS and TB, including matching TB and AIDS registries, conducting HIV serologic surveys of TB patients, providing HIV counseling and testing to TB patients, offering chemoprophylaxis to HIV-infected patients with TB infection and other high-risk persons with TB infection, expanding the AIDS case definition to include TB patients, and investigating nosocomial outbreaks among HIV-infected TB patients. He also participated in the first reported outbreak of airborne TB transmission from a patient with extrapulmonary TB. From 1990 to 1996, Alan served as a medical epidemiologist and conducted the first nationwide studies of drug-resistant TB and completion of TB therapy, using individual case reports. He also designed the expanded TB surveillance system to collect information on drug resistance, HIV status, drug regimen, and completion of therapy, as well as substance abuse and residence in high-risk facilities.

From 1997 to 2000, Alan served as Deputy Chief of the Lead Poisoning Prevention Branch, National Center for Environmental Health. From 2001 to 2002, he served as Acting Chief of the Assessment Branch and as Acting Chief of the Immunization Registry Support Branch, National Immunization Program. From 2002 to 2005, he worked in the Epidemiology Branch, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, and served as the first CDC Project Officer for the National Youth Tobacco Survey. Alan did his undergraduate work at the University of Connecticut, received MD and MPH degrees from Yale, and did his pediatrics training at Massachusetts General Hospital.

Sekai Chideya, MD, MPH, joined the International Research and Programs Branch (IRPB) in August as an Epidemic Intelligence Service (EIS) Officer. She received her MD degree from the University of California-San Francisco School of Medicine in 2000, and her MPH degree from Johns Hopkins School of Public Health in 1999. She was a resident with the Georgetown University Family Practice Program from 2000 to 2003. She is board certified in family practice and has worked most recently with the Kaiser Permanente Medical Group, as well as with the Berkeley Suitcase Youth Clinic as a volunteer providing medical care to the homeless. She received her undergraduate degree from Swarthmore College.

Reuben Granich, MD, MPH, left DTBE in May 2005 to take a new post as a technical advisor and program officer with the Office of the Global AIDS Coordinator (S/GAC) in Washington, DC. Housed in the Department of State, the Office of the Global AIDS Coordinator is charged with coordinating the U.S. government (USG) effort to combat HIV/AIDS in more than 100 nations around the world. This effort includes a $15 billion, 5-year budget with a special focus on the 15 nations that account for more than 50 percent of the world's HIV infections. Reuben will be working within the Program Services unit, developing and monitoring implementation plans for the Emergency Plan's focus countries. In 1996 Reuben joined DTBE as an EIS officer with the International Activities unit, as the International Research and Programs Branch was known then. During this time he completed and published a number of manuscripts, and was the lead author on CDC/WHO/IUATLD international guidelines for reducing nosocomial transmission of TB in resource-limited settings. After completing his EIS assignment in 1998, he was accepted into the CDC preventive medicine residency program and departed for California, obtaining an MPH degree at the University of California at Berkeley in 1999 and spending the practicum year of his residency with the California Health Department. In 2000 Reuben joined the DTBE Field Services Branch as a Medical Officer assigned to the California State TB Control Branch. During this time his accomplishments included conducting important outbreak investigations; serving as the lead for the California TB Control Program's binational

activities; and serving as the CDC liaison to the Mexico National TB Program for the first population-based survey of TB drug resistance in Mexico, providing a basis for Mexico to add a fourth drug to its standard treatment regimen for TB patients. In April 2002, Reuben was reassigned to the International Research and Programs Branch and accepted an 18-month secondment to the World Health Organization as the Medical Officer in Tuberculosis to the Revised National TB Control Program (RNTCP) in India. During his tour, Reuben contributed immensely to the expansion of access to DOTS services, from 459 million (45%) to 772 million (72%) persons. In 2004, he returned to the International Research and Programs Branch in Atlanta. After returning, he provided very much needed technical support to TB/HIV treatment and care projects in close collaboration with the Global AIDS Program.

Vernard Green has been selected for the Field Services and Evaluation Branch (FSEB) Public Health Advisor position in Newark, New Jersey. Since 2003 he has been serving as a Public Health Advisor I Disease Intervention Specialist with the North Carolina Department of Health and Human Services, working in the STD and HIV programs. Vernard also brings to his new position his military experience as a Marine corpsman, having served at the Camp Lejeune, North Carolina, medical center from 1985 to 1992. Vernard is currently pursuing an MS degree in public health at Walden University. He started in his new position on July 25, 2005.

Bruce Heath was selected for the Field Services and Evaluation Public Health Advisor (PHA) position in Austin, Texas, where he will be working with the Binational Projects. Bruce has a BA degree in Spanish and a graduate certificate in public health with a concentration in health education. He began his career with CDC in the Miami STD Prevention Program in 1992 as a Disease Intervention Specialist. He moved to Fulton County, Georgia, in 1995, continuing to work as a CDC Disease Intervention Specialist. In 1999 he took a position with the syphilis elimination program with the Division of STD Prevention at headquarters, where he worked with the newly developed Syphilis Rapid Response Teams and other exciting projects. He then moved to the Training and Health Communications Branch in DSTD, where he served as a project officer for the National Network of STD/HIV Prevention Training Centers. Most recently, Bruce was assigned to the Puerto Rico Department of Health STD/HIV Prevention Program as the Senior PHA. Bruce looks forward to making the change to TB elimination. Bruce started his position on August 7, 2005.

Michele Hlavsa, RN, MPH, joined DTBE in the Surveillance, Epidemiology, and Outbreak Investigations Branch (SEOIB) in July as an Epidemic Intelligence Service (EIS) officer. Michele received her RN degree in 1997 from the College of New Jersey, where she graduated magna cum laude, and her MPH from Emory University in 2003, where she was awarded the Charles C. Shepard scholarship. Since 2002, Michele has worked in the Division of Parasitic Diseases at CDC conducting outbreak investigations and analyses of surveillance data of several parasitic diseases. From 1999 to 2001, she was an infection control practitioner with the New Jersey Department of Health.

Heather Joseph, MPH, of DTBE's Clinical and Health Systems Research Branch has been assigned to the Ethiopia office of CDC's Global AIDS Program through the International Experience and Technical Assistance (IETA) program. During her 3 months in Addis, she will be helping the newly appointed Associate Director for Science for Ethiopia-GAP, Dr. Shabbir Ismail, develop an agenda for targeted evaluation and operational research. She will also help develop human subject research

guidance, including guidance for institutional review board clearances.

Jimmy R. Keller, DHSc, a Field Services and Evaluation Branch Public Health Advisor (PHA) with the North Carolina TB Program, has completed the requirements for the doctor of health science (DHSc) degree, which was conferred June 30, 2005. Jimmy completed a military career in September 1990 and started his public health career with CDC as a Public Health Associate I with the National Center for Prevention Services Division of STD Prevention in May 1991. His first assignment was with the Dade County Public Health Unit, Miami, Florida. That assignment began with the STD epidemiology course conducted at the South Florida Training Center in Ft. Lauderdale, Florida, and the intensive course for acquiring interviewing skills, *Introduction to STD Intervention*. After working with the Miami STD Clinic for 1.5 years, he was reassigned to the New York City Bureau of STD Control. His first year was at the Ft. Greene Health Center in Brooklyn, and his second year was at the Jamaica STD Clinic in Queens. While serving in this assignment, he was selected for a Supervisory PHA position with the New York City Bureau of TB Control at the Chelsea and Morrisania Chest Clinics in January 1995. In 1996 NCHSTP initiated the graduate certificate program in public health. Having been selected for a newly created PHA position at the Detroit City TB Program, Jimmy started his new job in Detroit and entered the second cohort of the graduate certificate program (Johns Hopkins University School of Public Health) in 1998, completing the graduate certificate program in January 2000. He accepted a transfer to the Ohio TB Program in January 2001. While in Ohio, Jimmy enrolled in the Nova Southeastern University, Health Professions Division, health science doctorate program in fall 2002, taking advantage of CDC's Course-by-Course Education program. In 2003, he accepted a transfer to the North Carolina TB Program.

Ted Misselback, a Field Services and Evaluation Branch Public Health Advisor (PHA) currently assigned to Nashville, Tennessee, was named the CDC Employee of the Month for August 2005. In response to a cluster of cases, including two deaths, in a homeless shelter in St. Louis, Missouri, Ted, who was then assigned to the St. Louis Health Department, coordinated a multipronged attack against this problem. He was the leading advocate in the planning and implementation of an innovative public/private partnership consisting of 11 different organizations. Ted searched the backrooms of city offices for original architectural plans, crawled through air ducts, climbed onto roofs, researched air filter and UV light technology, managed complicated funding strategies, and ensured coordinated efforts of all outbreak response team members. In addition, Ted's efforts resulted in a site visit from a team from the Division of Respiratory Disease Services at NIOSH, who made a number of recommendations to improve environmental and engineering systems. Ted was able to obtain additional funding in order to implement many of these recommendations. Owing to the efforts that Ted spearheaded, and those of his local, state, and federal colleagues, there have been no cases since this intervention.

Eric Pevzner, PhD, MPH, joined the International Research and Programs Branch (IRPB) in August 2005 as an Epidemic Intelligence Service (EIS) Officer. Eric completed his doctorate in health behavior and health education at the University of North Carolina at Chapel Hill in June 2005. In 1998, he received his MPH degree from the Rollins School of Public Health at Emory, and received his BS degree in psychology from Michigan State. Eric has worked with CDC previously as a consultant, most recently with the Division of Adolescent and School Health conducting an evaluation of an international teachers' training program to prevent HIV infection in Africa.

Kate Waldman has joined the Clinical and Health Systems Research Branch for a 6-month fellowship with DTBE. Kate is currently pursuing a masters degree in health sciences at Johns Hopkins University in the department of International Health, with an emphasis on social and behavioral science. In 2001, she earned a BA degree in anthropology from Skidmore College in Saratoga Springs, New York. Prior to starting graduate school, Kate worked for 3 years assisting in the management of various development projects throughout Latin America. Kate will be working on two projects in DTBE: "Perception of Tuberculosis among Foreign-Born Persons: An Ethnographic Study" and "Improving Tuberculosis Services for HIV-Infected Persons."

CALENDAR OF EVENTS

September 15-16, 2005
The TB Cohort Review Process
The Charles P. Felton National Tuberculosis Center at Harlem Hospital
New York City, New York
Tel: (212) 939-8254
http://www.harlemtbcenter.org/

September 21-24, 2005
45th Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC)
New Orleans, Louisiana
http://www.icaac.org/45ICAAC/45icaac.asp

September 25-29, 2005
23rd IUATLD Eastern Region Conference
Pakistan Antituberculosis Association
http://www.iuatld.org/full_picture/en/frameset/frameset_ns6.phtml?page=../conf_courses/conferences/liste_conferences.phtml

October 6-9, 2005
43rd Annual Meeting of the Infectious Diseases Society of America (IDSA)
San Francisco, CA
http://www.idsociety.org/

October 12-13, 2005
Midwest TB Controllers Association Annual Meeting
Deadwood, South Dakota
CDC/DTBE

October 18-22, 2005
36th International Union Against Tuberculosis and Lung Disease World Conference on Lung Health
Paris, France
International Union Against Tuberculosis and Lung Disease
Deadline for early registration: July 20, 2005
http://www.worldlunghealth.org/Conf2005/index.php

October 24-28, 2005
2005 Program Managers Course
Atlanta, GA
CDC/DTBE
Participants are nominated by the DTBE program consultant for their area. Please contact your consultant if interested in attending.

October 27-28, 2005
11th Annual Four Corners TB & HIV Conference
Durango, Colorado
For additional information: Gayle Schack, RN
Phone: (303) 692-2635
E-mail: gayle.schack@state.co.us

October 29-November 3, 2005
Chest 2005
Montreal, CANADA
http://www.chestnet.org/

November 2-3, 2005
Semiannual Meeting of the TB Trials Consortium
Atlanta, GA
CDC, DTBE

November 5-9, 2005
133rd APHA Annual Meeting
New Orleans, Louisiana
American Public Health Association
http://www.apha.org/meetings/

November 16-17, 2005
Meeting of the Advisory Council for the Elimination of Tuberculosis
Atlanta, GA
CDC/DTBE

December 7-8, 2005
TB Epidemiologic Studies Consortium 8th Semiannual Meeting
Denver, CO
CDC, DTBE

April 19-21, 2006
TB Vaccines for the World – TBV 2006
Vienna, AUSTRIA
http://www.meetingsmanagement.com/tbv_2006/index.htm